## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re Patent Application of: | ) Confirmation No.: 8897 |
| Yasushi SATO | ) Examiner: Martin Lerner |
| Serial No.: 10/559,571 | ) Group Art Unit: 2626 |
| Filed: December 5, 2005 | ) |
| For: SPEECH SYNTHESIS FOR | ) |
| SYNTHESIZING MISSING PARTS | ) |

## AMENDMENT

Honorable Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Official Action mailed October 9, 2009, and the Advisory Action mailed February 18, 2010, please consider the following amendments and remarks in connection with the above-identified application.

**Amendments to the Claims** are reflected in the listing of claims, which begins on page 2 of this paper.

**Remarks** begin on page 8 of this paper.

The listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1.-41. (Canceled)

42. (Previously Presented) A speech synthesis device, comprising:

voice unit storage means for storing a plurality of pieces of voice unit data representing voice units;

phoneme storage means for storing a plurality of pieces of phoneme data each of which is a phoneme or comprises phoneme fragments composing a phoneme;

cadence prediction means for inputting sentence information representing a sentence to predict the cadence of voice units composing the sentence;

selecting means for selecting voice unit data satisfying predetermined conditions out of the plurality of pieces of voice unit data stored in the voice unit storage means, wherein the predetermined conditions are that the voice unit data to be selected matches in its reading with the voice unit composing the sentence and has a correlation greater than a predetermined amount with a cadence prediction result by the cadence prediction means;

missing part cadence prediction means for predicting the cadence of voice units which have been decided not to satisfy the predetermined conditions by the selection means;

missing part synthesis means for specifying phonemes contained in the voice unit decided not to satisfy the predetermined condition by the selection means out of the voice units composing the sentence, for acquiring phoneme data representing the specified phoneme or phoneme fragments composing the specified phoneme from the phoneme storage means, for converting the acquired phoneme data so that the

phoneme or phoneme fragments represented by the acquired phoneme data matches with a cadence prediction result by the missing part cadence prediction means, and for interconnecting the converted data, thereby synthesizing speech data representing a waveform of the voice unit; and

creation means for interconnecting the voice unit data selected by the selection means and the speech data synthesized by the missing part synthesis means, thereby creating data representing synthesis speech.


43. (Previously Presented) The speech synthesis device according to claim 42, wherein the selection means selects the voice unit data out of the plurality of pieces of voice unit data stored in the voice unit storage means under the predetermined conditions further including that the presence or absence of nasalization or devocalization of the voice unit data matches with the cadence prediction result by the cadence prediction means.


44. (Previously Presented) The speech synthesis device according to claim 43, wherein the device further comprises utterance speed conversion means for acquiring utterance speed data specifying conditions of a speed for producing the synthesis speech created by the reaction means and for converting the voice unit data and/or speech data so as to represent a speech to be produced at a speed satisfying the conditions specified by the utterance speed data.


45. (Previously Presented) The speech synthesis device according to claim 44, wherein the utterance speed conversion means operates to convert the voice unit data and/or the speech data so as to represent a speech to be uttered at a speed to be produced at a speed satisfying the conditions specified by the utterance speed data, by eliminating a segment representing a phoneme fragment from voice unit data and/or

speech data composing data representing the synthesis speech or by adding a segment representing a phoneme fragment to the voice unit data and/or speech data.

46. (Currently Amended) The speech synthesis device according to any of claims claim 42, wherein the voice unit storage means operates to associate phonetic data representing a reading of voice unit with the voice unit data, and the selection means operates to handle voice unit data which is associated with phonetic data representing a reading matching with the reading of the voice unit composing the sentence, as voice unit whose reading is common with the voice unit.

47. (Currently Amended) The speech synthesis device according to any of claims claim 43, wherein the voice unit storage means operates to associate phonetic data representing a reading of voice unit with the voice unit data, and the selection means operates to handle voice unit data which is associated with phonetic data representing a reading matching with the reading of the voice unit composing the sentence, as voice unit whose reading is common with the voice unit.

48. (Currently Amended) The speech synthesis device according to any of claims claim 44, wherein the voice unit storage means operates to associate phonetic data representing a reading of voice unit with the voice unit data, and the selection means operates to handle voice unit data which is associated with phonetic data representing a reading matching with the reading of the voice unit composing the sentence, as voice unit whose reading is common with the voice unit.

49. (Currently Amended) The speech synthesis device according to any of claims claim 45, wherein the voice unit storage means operates to associate phonetic data representing a reading of voice unit with the voice unit data, and the selection means operates to handle voice unit data which is associated with phonetic data

representing a reading matching with the reading of the voice unit composing the sentence, as voice unit whose reading is common with the voice unit.


50. (Previously Presented)  A speech synthesis method performed by a speech synthesis device having storage means and processing means, the method comprising the steps of:

storing in the storage means a plurality of pieces of voice unit data representing voice units;

storing in the storage means a plurality of pieces of phoneme data each of which is a phoneme or comprises phoneme fragments composing a phoneme;

inputting in the processing means sentence information representing a sentence to predict the cadence of voice units composing the sentence;

selecting, in the processing means, voice units satisfying predetermined conditions out of the plurality of pieces of voice unit data stored in the storage means, wherein the predetermined conditions are that the voice unit data to be selected matches in its reading with the voice unit composing the sentence and has a correlation greater than a predetermined amount with a cadence prediction result;

predicting in the processing means the cadence of voice units which have been decided not to satisfy the predetermined conditions;

in the processing means, specifying phonemes contained in the voice unit decided not to satisfy the predetermined conditions out of the voice units composing the sentence, acquiring phoneme data representing the specified phoneme or phoneme fragments composing the specified phoneme from the storage means, converting the acquired phoneme data so that the phoneme or phoneme fragments represented by the acquired phoneme data matches with a cadence prediction result, and interconnecting the converted data, thereby synthesizing speech data representing a waveform of the voice unit; and

in the processing means, interconnecting the selected voice unit data and the synthesis speed data, thereby creating data representing synthesis speech.

51. (Previously Presented)  The speech synthesis method according to claim 50, wherein the processing means operates to select the voice unit data out of the plurality of pieces of voice unit data stored in the storage means under the predetermined conditions further including that the presence or absence of nasalization or devocalization of the voice unit data matches with the cadence prediction result.

52. (Previously Presented)  A computer readable medium which records a computer program causing a computer to operate as:

voice unit storage means for storing a plurality of pieces of voice unit data representing voice units;

phoneme storage means for storing a plurality of pieces of phoneme data each of which is a phoneme or comprises phoneme fragments composing a phoneme;

cadence prediction means for inputting sentence information representing a sentence to predict the cadence of voice units comprising the sentence;

selecting means for selecting voice unit data satisfying predetermined conditions out of the plurality of pieces of voice unit data stored in the voice unit storage means, wherein the predetermined conditions are that the voice unit data to be selected matches in its reading with the voice unit composing the sentence and has a correlation greater than a predetermined amount with a cadence prediction result by the cadence prediction means;

missing part cadence prediction means for predicting the cadence of voice units which have been decided not to satisfy the predetermined conditions by the selection means;

missing part synthesis means for specifying phonemes contained in the voice unit decided not to satisfy the predetermined condition by the selection means out of the

voice units composing the sentence, for acquiring phoneme data representing the specified phoneme or phoneme fragments composing the specified phoneme from the phoneme storage means, for converting the acquired phoneme data so that the phoneme or phoneme fragments represented by the acquired phoneme data matches with a cadence prediction result by the missing part cadence prediction means, and for interconnecting the converted data, thereby synthesizing speech data representing a waveform of the voice unit; and

creation means for interconnecting the voice unit data selected by the selection means and the speech data synthesized by the missing part synthesis means, thereby creating data representing synthesis speech.


53. (Previously Presented) The computer readable medium according to claim 52, wherein the selection means selects the voice unit data out of the plurality of pieces of voice unit data stored in the voice unit storage means under the predetermined conditions further including that the presence or absence of nasalization or devocalization of the voice unit data matches with the cadence prediction result by the cadence prediction means.

## REMARKS

The Official Action mailed October 9, 2009, and the Advisory Action mailed February 18, 2010, have been received and their contents carefully noted. This response supplements the *After Final Amendment* filed February 9, 2010. Filed concurrently herewith is a *Request for Two Month Extension of Time*, which extends the shortened statutory period for response to March 9, 2010. Also, filed concurrently herewith is a *Request for Continued Examination.* Accordingly, the Applicant respectfully submits that this response is being timely filed.

At this opportunity, the Applicant has amended claims 46-49 to correct a minor informality. Specifically, claims 46-49 previously included the phrase "any of claims" (generally used with multiple dependent claims); however, claims 46-49 are dependent on a single claim. Therefore, the phrase "any of claims" is not necessary. By the present *Amendment*, "any of claims" has been changed to "claim."

For the reasons set forth in the *Amendment* filed February 9, 2010, all claims are believed to be in condition for allowance.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized to charge fees under 37 C.F.R. §§ 1.16, 1.17, 1.20(a), 1.20(b), 1.20(c), and 1.20(d) (except the Issue Fee) which may be required now or hereafter, or credit any overpayment to Deposit Account No. 50-2280.

Respectfully submitted,

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